GWU-SCD 74-14P

# SCIENTIFIC PUBLICATIONS AND PRESENTATIONS RELATING TO PLANETARY QUARANTINE

Volume V
*The 1973 Supplement*



June 1974

SCIENCES COMMUNICATION DIVISION
THE GEORGE WASHINGTON UNIVERSITY MEDICAL CENTER
2001 S STREET, N.W., WASHINGTON, D.C. 20009
Telephone (202) 462-5828

# SCIENTIFIC PUBLICATIONS AND PRESENTATIONS RELATING TO PLANETARY QUARANTINE

Volume V
The 1973 Supplement

Frank D. Bradley

Work Performed under NASA Contract NSR-09-010-027

for

Planetary Quarantine Office, Planetary Programs
NASA Office of Space Science

The George Washington University
Department of Medical and Public Affairs
Science Communication Division
2001 S Street, N.W., Washington, D.C. 20009

GWU-SCD 74-14P
June 1974

# PREFACE

This publication is the seventh annual supplement to the original bibliography which was issued in June, 1967.

The annual supplement consists of citations of documents relating to planetary quarantine; many, but not all, refer to work supported by the Planetary Quarantine Office, Planetary Programs, National Aeronautics and Space Administration, Washington, D.C. The citations are assembled to bring up to date the survey of the current literature in the field. As in previous supplements there is a listing of documents published prior to the current reporting year. These are cited because of their substantive or historic value to the planetary quarantine program.

In certain references, numerals, preceded by letter(s), are given parenthetically as part of the citation. These numbers are to assist users in the procurement of a hard copy of the document from other than the corporate source. Those citations carrying "A" numbers are obtainable, for a fee, from the

American Institute of Aeronautics and Astronautics, Inc.
Technical Information Service
750 Third Avenue
New York, New York 10017

Documents with "N", "NASA-CR", "NASA-SP", "NASA-TM-X", "NASA-TN-D" and "NASA-TT-F" numbers are available, at set rates, from the

National Technical Information Service
U.S. Department of Commerce
5285 Port Royal Road
Springfield, Virginia 22151

"NASA-SP" codes documents are also obtainable from the

Superintendent of Documents
U.S. Government Printing Office
Washington, D.C. 20402

"X" numbered documents are limited in their distribution to NASA associated or contractor personnel.

"AD" coded documents are generally available from the

Defense Documentation Center
Cameron Station
Alexandria, Virginia 22314

The availability of a microfiche of the cited document is indicated by the use of the symbol # following the reference number. In each case the fiche is available from the same source as the hard copy document. "PB" microfiche are obtainable from NTIS and "T" microfiche from the Science Communication Division, The George Washington University.

CONTENTS

CITATIONS


1948

1. STUMBO, C.R. Technique for studying resistance of bacterial spores to temperatures in the higher range. Food Technology 2: 228-240. 1948.

1949

2. JOHNSON, F.H. and C.E. Zobell. Acceleration of spore disinfection by urethan and its retardation by hydrostatic pressure. Journal of Bacteriology 57(3): 359-362. 1949.

3. JOHNSON, F.H. and C.E. Zobell. Retardation of thermal disinfection of Bacillus subtilis spores by hydrostatic pressure. Journal of Bacteriology 57(3): 353-358. 1949.

1954

4. BROWN, A.D. Survival of airborne microorganisms. III. Effects of temperature. Australian Journal of Biological Sciences 7: 444-451. 1954.

1955

5. HOFFMAN, R.K., S.B. Yeager and S. Kaye. Method for testing self-disinfecting surfaces. Soap & Chemical Specialties. August 1955. 6p.

1957

6. MURRELL, W.G. and W.J. Scott. Heat resistance of bacterial spores at various water activities. Nature 179(4557): 481-482. 1957.

1959

7. ANON: Report of the committee on the exploration of extraterrestrial space (CETEX). ICSU Review 1: 100-103. 1959.

8. HOFFMAN, R.K., S. Kaye and C.E. Feazel. Sporicidal surface coatings. Official Digest, Federation of Paint and Varnish Production Clubs. August 1959. 12 p.

1960

9. BEJUKI, W.M. Microbiological challenge in space. IN: Miller, B.M., ed. Developments in Industrial Microbiology. 1: 45-55. New York, Plenum Press. 1960.

10. DAVIS, M.S. and J.B. Bateman. Relative humidity and the killing of bacteria. I. Observations on Escherichia coli and Micrococcus lysodeikticus. Journal of Bacteriology 80(5): 577-579. 1960.

11. *idem*, II. Selection changes in oxidative activity associated with death. Journal of Bacteriology 80(5): 580-584. 1960.

12. SHEFNER, A.M. Adaptation of microorganisms to radiation. IN: Miller, B.M., ed. Developments in Industrial Microbiology. 1: 21-25. New York, Plenum Press. 1960.

1961

13. BATEMAN, J.B., P.A. McCaffrey, R.J. O'Connor, et al. Relative humidity and the killing of bacteria. The survival of damp Serratia marcescens in air. Applied Microbiology 9(6): 567-571. 1961.

14. BRUESCHKE, E.E., R.H. Suess and M. Willard. Survival of microorganisms in ultrahigh vacuum. Culver City, Calif., Hughes Aircraft Company. 1961. TM-679. 15 p.

15. DUFFETT, N.D., F.B. Engley, Jr., L.B. Hall, et al. Criteria for selection of germicides. American Journal of Public Health 51(7): 1054-1060. 1961.

16. NEY, L.F. Study of the combined effects of ionizing and sonic radiation on bacterial spores. Final technical report No. 2 for period June 1960 - June 1961. Menlo Park, Calif., Stanford Research Institute. 1961. PBU-3289. 35 p.

1962

17. BATEMAN, J.B., C.L. Stevens, W.B. Mercer, et al. Relative humidity and the killing of bacteria: The variation of cellular water content with external relative humidity or osomolality. Journal General Microbiology 29: 207-219. 1962.

18. BRUCH, C.W., M.G. Koesterer and M.R. Bruch. Studies on dry heat for the sterilization of electronic components of astrobiological space probes. Rochester, N.Y., Wilmot Castle Company. 1962. Presented at 62nd annual meeting of the American Society for Microbiology. 16 p.

19. DAVIS, N.S., G.J. Silverman, S.A. Goldblith, et al. Survival of spores at several temperatures in ultrahigh vacuum. IN: Bacteriological Proceedings of the Society of American Bacteriologists. Washington, D.C., American Society for Bacteriology. 1962. p. 31.

20. HALL, L.B. Room sterilization. Journal of the American Medical Association 181(5): 462. 1962.

21. HOBBY, G.L. Review of NASA-JPL spacecraft sterilization program. [Appendix III, Chapter 10]. IN: Review of Space Research. Washington, D.C., National Academy of Sciences - National Research Council. 1962. Publication 1079. p. 10-25 to 10-36.

22. KOESTERER, M.G. Dry heat sterilization of components for space probes. Rochester, N.Y., Wilmot Castle Co. 1962. Laboratory progress report 5. 13 p.

23. KOESTERER, M.G. and C.W. Bruch. Resistance of dry bacterial spores to sterilization by moist and dry heat. IN: Bacteriological Proceedings of the Society of American Bacteriologists. Washington, D.C., American Society for Bacteriology. 1962. Abstract No. A44. p. 30.

24. MILLER, A.K. Controlled contamination of hermetically sealed electronic components. Sunnyvale, Calif., Lockheed Missiles and Space Co. 1962. Final, LMSC-925194. 39 p.

25. National Academy of Sciences/National Research Council. Review of Space Research. Washington, D.C.. 1962. Publication 1079. 565 p.

26. PORTNER, D.M. and R.R. Jakubauskas. Procedure for evaluation of self-sterilizing resins. U.S. Army, Fort Detrick, Frederick, Maryland. 1962. Protection Branch report 11-63. 9 p.

27. SHULL, J.J. and R.R. Ernst. Graphical procedure for comparing thermal death of Bacillus stearothermophilus spores in saturated and superheated steam. Applied Microbiology 10(5): 452-457. 1962.

28. WHITFIELD, W.J. New approach to cleanroom design. Albuquerque, New Mexico, Sandia Corporation. March 1962. SC-4673(RR). 28 p.

29. WHITFIELD, W.J., J.C. Mashburn and W.E. Neitzel. New ways to control airborne contamination. Quality Assurance. December, 1962. 6 p.

1963

30. U.S. AIR FORCE. Standards and guidelines for the design and operation of clean rooms and clean work stations. Washington, D.C.. 1963. Technical Order 00-25-203. 50 p.

31. U.S. GOVERNMENT. Clean room and work station requirements, controlled environment. Federal Standard No. 209. Washington, D.C., General Services Administration. 1963. 21 p.

32. WHITFIELD, W.J., W.E. Neitzel, J.C. Mashburn, et al. Evaluation of a curtained laminar down-flow clean room. Development Report. Albuquerque, New Mexico, Sandia Corporation. August 1963. SCDR 221-63. 15 p.

33. KOESTERER, M.G. Studies for sterilization of space probe components. Rochester, N.Y., Wilmot Castle Co. 1963. Progress report #2. 35 p. With appendix - Laboratory progress report #1. 5 p.

34. McDADE, J.J. and L.B. Hall. Experimental method to measure the influence of environmental factors on the viability and the pathogenicity of Staphylococcus aureus. American Journal of Hygiene 77(1): 98-108. 1963.

35. McDADE, J.J. and L.B. Hall. Survival of Staphylococcus aureus in the environment. I. Exposure on surfaces. American Journal of Hygiene 78(3): 330-337. 1963.

36. MARSH, R.C. Adaptability of laminar air flow for contamination control. Journal of American Association for Contamination Control 2(5): 101-104. 1963.

37. OCTAVIAN, P. and D. Cristian. g = 0: Current problems in bioastronautics. Stiinta Si Technica 15(1): 19-21. 1963. Wright Patterson, Air Force Base, Ohio. FTD-TT-64-55611.

38. PORTNER, D.M. Effect of nickel-cadmium batteries upon bacterial spores. U.S. Army, Fort Detrick, Frederick, Maryland. 1963. Protection Branch report 20-63. 7 p.

39. PORTNER, D.M. Sterilization of naturally contaminated metal surfaces with dry heat. U.S. Army, Fort Detrick, Frederick, Maryland. Protection Branch report 8-64. 1963. 6 p. (N65-17290#; NASA CR-52899).

1964

40. THE DEPARTMENT OF AIR FORCE. Criteria for Air Force clean facility design and construction. Air Force Manual 88-4, Chapter 5. Washington, D.C.. 1964. 33 p.

41. ALG, R.L., G.J. Harris and M.S. Barbeito. Disinfection with BPL. Soap & Chemical Specialties 40(9): 97-100. 1964. (AD638565#).

42. ANGELOTTI, R., J.L. Wilson, W. Litsky, et al. Comparative evaluation of the cotton swab and Rodac methods for the recovery of Bacillus subtilis spore contamination from stainless steel surfaces. Health Laboratory Science 1(4): 289-296. 1964. (T-1354#).

43. FAVERO, M.S. Assessment of microbial contamination on space hardware. IN: Bacteriological Proceedings of the American Society for Microbiologists. Washington, D.C. 1964. p. 9.

44. HALL, L.B. Surfaces and their cleaning. Presented at the National Planning Conference on Design for Asepsis. New York. 1964.

45. KOESTERER, M.G. Studies for sterilization of space probe components. Progress report No. 2 for period 1 December 1963 - 1 March 1964. Rochester, N.Y., Wilmot Castle Company. 1964. 24 p. (N64-23019; NASA CR-56474).

46. McDADE, J.J. and L.B. Hall. Survival of gram-negative bacteria in the environment. I. Effect of relative humidity on surface-exposed organisms. American Journal of Hygiene 80(2): 192-204. 1964.

47. McDADE, J.J. and L.B. Hall. Survival of Staphylococcus aureus in the environment. II. Effect of elevated temperature on surface-exposed staphylococci. American Journal of Hygiene 80(2): 184-191. 1964.

48. PORTNER, D.M. Level of microbial contamination in a clean room during a one year period. U.S. Army, Fort Detrick, Frederick, Maryland. Protection Branch report 11-65. 1964. 20 p.

49. TREXLER, P.C. Microbic contamination control. Bulletin of the Parenteral Drug Association 18: 8-12. 1964. (T-1092#).

50. WHITFIELD, W.J., J.C. Mashburn, W.E. Neitzel, et al. Basic design requirements for laminar air flow dust control devices. Albuquerque, New Mexico, Sandia Corporation. May 1964. SC-R-64-145A. (Rev. Aug. 1964). 24 p. (N67-85082).

51. WILLARD, M. and A. Alexander. Self-sterilizing coating for spacecraft surfaces. Nature 202(4933): 658-659. 1964.

1965

52. ANELLIS, A., N. Grecz and D. Berkowitz. Survival of Clostridium botulinum spores. Applied Microbiology 13(3): 397-401. 1965.

53. ARNOLD, V.E., A.J. Jack, J.G. King, et al. Preliminary report on microbiological studies in a laminar down-flow clean room. Albuquerque, New Mexico, Sandia Corporation. 1965. SC-RR-65-47. 27 p.

54. BRUCE, A.K. Factors influencing radioresistance of microorganisms. Technical progress report January - September. 1965. Albany, N.Y., Research Foundation of State University of New York. 1965. 24 p. (N66-20324#).

55. FAVERO, M.S., J.R. Puleo, J.H. Marshall, et al. Services provided in support of the planetary quarantine requirements of NASA. Comparative levels and types of microbial contamination detected in industrial clean rooms. Report #9. Phoenix, Arizona, Public Health Service, National Communicable Disease Center. 1965. 40 p. (N66-15001#; NASA CR-69216).

56. GODDING, R.M. and V.H. Lynch. Viability of Bacillus subtilis spores in rocket propellants. Applied Microbiology 13(1): 10-14. 1965.

57. HAWRYLEWICZ, E.J., C.A. Hagen and R. Ehrlich. Survival and growth of potential microbial contaminants in severe environments. Chicago, Ill. IIT Research Institute. 1965. 10 p.

58. HEARTH, D.P. Voyager. Astronautics and Aeronautics 3: 16-21. May 1965. (A65-24223#).

59. HELLMAN, S.K. Use of radiation techniques for the inhibition of bacterial growth in liquid media. New York, N.Y., Vitro Engineering Co. July 1965. KLX-1872. 34 p. (N66-27133#).

60. HOTCHIN, J., P. Lorenz and C. Hemenway. Survival of microorganisms in space. Nature 206(4983): 442-445. 1965.

61. JET PROPULSION LABORATORY. Report on microbial contaminants in solid propellant. Prepared by Dynamic Science Corporation. April 1965. 22 p.

62. JET PROPULSION LABORATORY. Microorganisms in solid materials: Task III, Recovery levels of microbial organisms inoculated into solid propellant specimens. Prepared by Dynamic Science Corporation. February 1965. Report 4201-D. 30 p.

63. JET PROPULSION LABORATORY. Supporting Research and Advanced Development. 1 February - 31 March 1965. Pasadena, California. 1965. Space Program Summary 37-32, Vol. IV. 310 p.

64. McDADE, J.J., A.S. Irons and V.J. Magistrale. Microbiological survey of Hughes Aircraft Company facilities involved in the assembly and for testing of Surveyor spacecraft. IN: Space Programs Summary 37-32, Vol. IV. Pasadena, California, Jet Propulsion Laboratory. 1965. 25-35 p.

65. MARGARD, W.L. and R.F. Logsdon. Evaluation of the bacterial filtering efficacy of air filters in the removal and destruction of airborne bacteria. Journal of American Society of Heating, Refrigeration and Air-Conditioning Engineers Incorporated. May 1965. 6 p.

66. PORTNER, D.M. Comparison of the level of microbial contamination on stainless steel, aluminum, glass and lucite. U.S. Army, Fort Detrick, Frederick, Maryland. 1965. Protection Branch report 15-65. 5 p.

67. PORTNER, D.M. Dry heat sterilization of microorganisms at 105°C. U.S. Army, Fort Detrick, Frederick, Maryland. 1965. Protection Branch report 19-65. 5 p.

68. REED, L.L. Microbiological analysis techniques for spacecraft sterilization. IN: Space Programs Summary 37-32, Vol. IV. Pasadena, California, Jet Propulsion Laboratory. 1965. 35-42 p.

69. STUMBO, C.R. Death of bacteria subjected to moist heat. IN: Thermobacteriology in Food Processing. New York, N.Y. Academic Press. 1965. p. 56-76.

70. UNGAR, A. Probability of biological contamination of Mars. Chicago, Ill. IIT Research Institute. 1965. 7 p.

1966

71. ATWOOD, K.C. Sterilization and contamination: The nature of the problem. IN: Biology and the exploration of Mars. Washington, D.C. National Academy of Sciences/National Research Council. 1966. p. 449-462. (N66-36491#).

72. BORSHCHENKO, V.V., M.I. Kozar, F.K. Savinich, et al. Some means of reducing bacterial propagation during prolonged space flights. 1966. p. 27-31. Arlington, Virginia. Joint Publications Research Service 38,596. (TT66-35021; N67-13426#).

73. CORNELL, R.G. Biostatistics of space exploration: Microbiology and sterilization. Tallahassee, Florida State University. February 1966. Progress report. 14 p. (NASA CR-71809).

74. *idem*, August 1966. Progress report. 15 p. (N66-36058#; NASA-CR-77803).

75. CORNELL, R.G. Variation in measurements of microbial load. Tallahassee, Florida State University. February 1966. Technical report #2. 7 p. (N66-24493#; NASA-CR-74549).

76. CUDDIHY, E.F., and J. Moacanin. Studies on sterilizable elastomers. IN: Space Programs Summary 37-40, Vol. IV, June 1 - July 31, 1966. Supporting Research and Advanced Development. Pasadena, California, Jet Propulsion Laboratory. August 1966. p. 98-103. (N67-15723#; NASA CR-81201).

77. GODDARD SPACE FLIGHT CENTER. Sterilization - A selected bibliography from the literature retrieval system. Space Biology Branch. Greenbelt, Maryland, NASA. March 1966. X 450-66-53. 18 p.

78. KEPPLE, R.J., P. Kuzmik and R.G. Crawford. Thermostructural effects of heat sterilization on a planetary spacecraft. AIAA/ASME Structural & Materials Conference, Cocoa Beach, Florida. April 1966. 4 p.

79. KRETZ, A.P., Jr. and R.R. Ernst. The roving probe. Contamination Control V(7): 18-26. 1966.

80. LeDOUX, F.N. Decontamination techniques for lunar orbiting spacecraft. Presented at the XVII Congress of the International Astronautical Federation, Madrid, Spain. October 1966. 11 p. (N68-10941#; A67-12386#).

81. LeDOUX, F.N. Procedure for personnel clean room deportment. Greenbelt, Maryland, Goddard Space Flight Center. 1966. X723-66-240. 12 p. (N68-10102#; NASA TM X 55998).

82. LIEBERMAN, A. Clean room technology as related to aerospace hardware. IN: Cleaning Conference, Marshall Space Flight Center, Huntsville, Alabama. January 1966. p. 285-302.

83. MEETER, D.A. Newton-gradient method for non-linear problems in Hilbert space. Tallahassee, Florida State University. August 1966. Technical report #7. 16 p. (N66-35783#; NASA-CR-77682).

84. MURRELL, W.G. and W.J. Scott. Heat resistance of bacterial spores at various water activities. Journal of General Microbiology 43: 411-425. 1966.

85. PETRASOVITS, A. Dilution model: A Bayesian approach. Tallahassee, Florida State University. August 1966. Technical report #6. 30 p. (N66-36075#; NASA-CR-77799).

86. RYDELEK, R.F., A.L. Landis and D. Kohorst. Study of the effect of ethylene oxide-freon 12 upon properties of polymers and metallic surfaces. Final Report 10 October 1964 - 31 March 1966. Culver City, California, Hughes Aircraft Company. 1966. Report No. P66-96. (N66-29757#; NASA-CR-76039).

87. WASHAM, C.J., C.H. Black and W.E. Sandine. Evaluation of filters for removal of bacteriophages from air. Applied Microbiology 14(4): 497-505. 1966.

88. WILKINSON, T.R. Survival of bacteria on metal surfaces. Applied Microbiology 14(3): 303-307. 1966.

1967

89. ASHWOOD-SMITH, M.J. and B.A. Bridges. On the sensitivity of frozen micro-organisms to ultraviolet radiation. Proceedings of the Royal Society 168: 194-202. 1967. (T-1145#).

90. BEAUCHAMP, J.J. Simultaneous nonlinear estimation. Tallahassee, Florida State University. February 1967. Technical report #11. 218 p. (N67-19923; NASA-CR-82967).

91. BOTAN, E.A. and T.H. Rider. Report on a study of chemical germicides. Prepared by AVCO Corporation, Space Systems Division for Jet Propulsion Laboratory, Pasadena, California. 1967. 10 p. (N68-22680#; NASA CR-94380; AVSSD-0133-67-CR).

92. BRIDGES, B.A., M.J. Ashwood-Smith and R.J. Munson. On the the nature of the lethal and mutagenic action of ultraviolet light on frozen bacteria. Proceedings of the Royal Society 168: 203-215. 1967. (T-1146#).

93. CHRISTENSEN, M.R., R.H. Green and J.A. Stern. Microbial sampling program for the Mariner Venus 67 flight spacecraft (Mariner V). IN: Space Programs Summary 37-46, Vol. IV. Pasadena, California, Jet Propulsion Laboratory. 1967. p. 48-55.

94. CORNELL, R.G. Biostatistics of space exploration: Microbiology and sterilization. Tallahassee, Florida State University. March 1967. Progress report. 3 p. (N67-90079).

95. *idem*, September 1967. Progress report. 4 p. (N67-90189).

96. DUGAN, V.L., W.J. Whitfield, J.J. McDade, et al. New approach to the microbiological sampling of surfaces: The vacuum probe sampler. Albuquerque, New Mexico, Sandia Laboratories. February 1967. SC-RR-67-114.

97. ENLOW, D.L. Feasible experimental program to measure charge and adhesion properties of microbes on various surfaces. King of Prussia, Pa., General Electric Company. 1967.

98. GREEN, R.H. R.L. Olson, E.A. Gustan, et al. Microbial survival of propellants before and after rocket firings. IN: Developments in Industrial Microbiology 8: 227-234. Washington, D.C., American Institute of Biological Sciences. 1967.

99. HAND, P.J. Sterilizable inertial sensors. IN: Space Programs Summary 37-46, Vol. IV. Pasadena, California, Jet Propulsion Laboratory. 1967. p. 81-82.

100. JET PROPULSION LABORATORY. Supporting Research and Advanced Development, for 1 June - 31 June 1967. Pasadena, California. 1967. Space Programs Summary 37-46, Vol. IV. 190 p.

101. KALFAYAN, S.H., B.A. Campbell and R.H. Silver. Effects of various sterilization cycles on the properties of polymeric products. IN: Space Programs Summary 37-46, Vol. IV. Pasadena, California, Jet Propulsion Laboratory. 1967. p. 139-141.

102. LUNNEY, E.J. Experimental assembly and sterilization laboratory routine cleaning and decontamination. Lowell, Mass., AVCO Corporation. 1967. 17 p. (N68-22777#; NASA-CR-94390).

103. NATIONAL AERONAUTICS AND SPACE ADMINISTRATION. Protection of the Earth's biosphere from lunar sources of contamination. Washington, D.C. 1967. Interagency agreement NMI 1052.90. 11 p.

104. OLSON, R.L. and R.H. Green. Laboratory investigations related to a systems-analysis approach to planetary quarantine. Seattle, Washington, The Boeing Company. July 1967. 12 p. (A67-35274#).

105. PAIK, W.W., S.C. Michael, C.D. Smith, et al. Dry heat resistance of bacterial spores (Bacillus globigii) upon selected spacecraft surface materials. IN: Space Programs Summary 37-46, Vol. IV. Pasadena, California, Jet Propulsion Laboratory. 1967. 43-48 p.

106. PELLICOTTI, R. Applications of sterilization math modeling techniques to planetary quarantine problems. General Electric Company. October 1967. 31 p.

107. PORTER, R.W. Soviet practices in space. Science 157: 487. 1967.

108. SCHWARTZ, H.C. and E.J. Lunney. Experimental assembly and sterilization laboratory. Personnel procedures for EASL operations: JPL procedures EASL 201.01. Lowell, Mass., AVCO Corporation. 1967. 12 p. (N68-22765#; NASA-CR-94351).

109. SONGER, J.R. Influence of relative humidity on the survival of some airborne viruses. Applied Microbiology 15(1): 35-42. 1967.

110. ZOBELL, C.E. and L.L. Hittle. Some effects of hyperbaric oxygenation on bacteria at increased hydrostatic pressures. Canadian Journal of Microbiology 13(10): 1311-1319. 1967.

1968

111. ADLER, V.G. Sterilization by low temperature steam and formaldehyde under sub-atmospheric pressures at 80°C. IN: Sneath, P.H.A. ed. Sterilization techniques for instruments and materials as applied to space research; COSPAR technique manual number 4. Paris, France, Muray Print. 1968. p. 141-155. (A69-15946#).

112. BALDOCK, J.D., D.Y.C. Fung and H.W. Walker. Rapid microtiter technique for study of heat destruction of bacterial spores. Applied Microbiology 16(10): 1627-1628. 1968.

113. BOND, W.W., M.S. Favero, N.J. Petersen, et al. Factor contributing to polyphasic survivor curves of mixed bacterial spore populations exposed to dry heat. Phoenix, Arizona, Communicable Disease Center, USPHS. Presented to Arizona Branch, ASM, Tuscon. March 1968. 2 p.

114. BRADY, H.F. Experimental heat chamber for sterilization of large interplanetary structures. 2nd monthly progress report. Prepared by Martin Marietta Corporation for Marshall Space Flight Center, Huntsville, Alabama. 1968. MCR-68-432; DCN 1-8-30-25755. 11 p.

115. BUCKENDAHL, D.E. Design evolution of the Wolf Trap life detector. IN: American Astronautical Society Space Projections from the Rocky Mountain Region. 1968. AAS 68-285. 11 p.

116. CAMERON, R.E., C.N. David and J. King. Soil toxicity in Antarctic dry valleys. Antarctic Journal of the U.S. 3(5): 164-166. 1968.

117. CAMERON, R.E., J. King and C. David. Soil microbial and ecological studies in southern Victoria Land. Antarctic Journal of the U.S. 3(4): 121-123. 1968.

118. DINEEN, P. Control of bacterial contamination of hard surfaces in the operating room. Association of Operating Room Nurses Journal 8(3): 57-60. 1968.

119. FAVERO, M.S. Services provided in support of the planetary quarantine requirements of NASA. Phoenix, Arizona, Communicable Disease Center. Presented to AIBS/PQAC. October 1968. 12 p.

120. IIT RESEARCH INSTITUTE. Life in extraterrestrial environments. Quarterly status report for period 15 May - 15 August 1968. Chicago, Ill. 1968. L6023-14. 13 p.

121. JET PROPULSION LABORATORY. Planetary quarantine. Semiannual Review of Research and Advanced Development. 1 January - 30 June 1968. Vol. 1. Pasadena, California. 1968. JPL 701-16. 41 p. (N69-12006#; NASA CR-97753).

122. MARSHALL SPACE FLIGHT CENTER. Literature study of ethylene oxide sterilization/decontamination. Huntsville, Alabama. 1968. 83 p. NASA-TMX-53715.

123. MATTONI, R.H.T. Space-flight effects and gamma radiation interaction on growth and induction of lysogenic bacteria. Bioscience. 18(6): 602-608. 1968.

124. PELLICOTTI, R. Continuing studies: Sterilization math modeling techniques applied to planetary quarantine problems. General Electric Company. February 1968. 22 p.

125. RUSSELL, A.D. and D. Harries. Factors influencing the survival and revival of heat-treated Escherichia coli. Applied Microbiology 16(2): 335-339. 1968.

126. TEAH, B.A. Bibliography of germfree research. 1967 supplement. Notre Dame, Indiana, Lobund Laboratory, University of Notre Dame. 1968. 21 p.

127. VANDREY, J.F. Non-existence of a biota-cloud recontamination hazard for a planetary lander. IN: American Astronautical Society Space Projections from the Rocky Mountain Region, 1968. AAS 68-287. 13 p.

128. VANDREY, J.F. Planetary lander re-contamination hazards and spacecraft-particle interaction physics. Journal of the Astronautical Sciences 15(4): 177-182. 1968.

1969

129. CAMERON, R.E. Desert microflora. IN: Semiannual Review of Research and Advanced Development. 1 July - 31 December 1968. Vol. 1 Pasadena, California, Jet Propulsion Laboratory. 1969. Doc. 701-23. p. 283-285.

130. CHRISTENSEN, M.R. Microbiological monitoring of spacecraft assembly facility operations. IN: Semiannual Review of Research and Advanced Development. Vol. 1 Pasadena, California, Jet Propulsion Laboratory. 1969. Doc. 701-23. p. 309-311.

131. GREEN, R.H., A.S. Irons, W.W. Paik, et al. Sterilization supporting activities. IN: Semiannual Review of Research and Advanced Development. Vol. 1 Pasadena, California, Jet Propulsion Laboratory. 1969. Doc. 701-23. p. 305-307.

132. HAND, P.J. Development of a sterilizable high-performance accelerometer. IN: Semiannual Review of Research and Advanced Development. Vol. 1 Pasadena, California, Jet Propulsion Laboratory. 1969. Doc. 701-23. p. 69-72.

133. HAND, P.J. Inertial sensor sterilization. IN: Semiannual Review of Research and Advanced Development. Vol. 1 Pasadena, California, Jet Propulsion Laboratory. 1969. Doc. 701-23. p. 63-67.

134. HAND, P.J. Investigation of sterilizable high-performance accelerometers. IN: Supporting Research and Advanced Development, Vol. III. Pasadena, California, Jet Propulsion Laboratory. 1969. p. 119-121.

135. HUBBARD, J.S. Microbiological studies. IN: Semiannual Review of Research and Advanced Development. Vol. 1 Pasadena, California, Jet Propulsion Laboratory. 1969. Doc. 701-23. p. 287-290.

136. IRONS, A.S. Development of ethylene oxide process specifications and procedures. IN: Semiannual Review of Research and Advanced Development. Vol. 1 Pasadena, California, Jet Propulsion Laboratory. 1969. Doc. 701-23. p. 291-294.

137. IRONS, A.S. Microbiological examination of spacecraft parts/interiors. IN: Semiannual Review of Research and Advanced Development. Vol. 1 Pasadena, California, Jet Propulsion Laboratory. 1969. Doc. 701-23. p. 301-302.

138. JET PROPULSION LABORATORY. Semiannual Review of Research and Advanced Development. Vol. 1 February 1969. Doc. 701-23. 359 p. (N69-35935#; NASA-CR-105419).

139. JET PROPULSION LABORATORY. Supporting Research and Advanced Development. Vol. III. 1969. Space Programs Summary 37-55. 271 p. (N70-15403#; NASA-CR-107569).

140. KALFAYAN, S.H. Sterilizable polymeric materials. IN: Semi-annual Review of Research and Advanced Development. Vol. 1 Pasadena, California, Jet Propulsion Laboratory. 1969. Doc. 701-23. p. 91-94.

141. KARPUKHIN, G.I., S.V. Slobodenyuk and V.K. Slobodenyuk. Method for determining virus on surfaces contaminated by virus aerosols. Translation of Gigiyena i Sanitariya (USSR) 33 (12): 60-64. 1968. Arlington, Virginia, Joint Publications Research Service 47764. 1969.

142. MARTIN, K. Matrix test of sterilizable piece-parts. IN: Semi-annual Review of Research and Advanced Development. Vol. 1 Pasadena, California, Jet Propulsion Laboratory. 1969. Doc. 701-23. p. 85-89.

143. NATIONAL AERONAUTICS AND SPACE ADMINISTRATION. Back contamination and quarantine containment requirements for manned lunar missions. Washington, D.C. 1969. Policy directive NPD 8020.13. 2 p.

144. NATIONAL AERONAUTICS AND SPACE ADMINISTRATION. Extraterrestrial exposure. Washington, D.C. 1969. Policy directive NPD 8020.14. 5 p.

145. NATIONAL AERONAUTICS AND SPACE ADMINISTRATION. Outbound lunar biological and organic contamination control: Policy and responsibility. Washington, D.C. 1969. Policy directive NPD 8020.8a. 2 p.

146. PAIK, W.W. and A.R. Hoffman. Review of heat specifications. IN: Semiannual Review of Research and Advanced Development. Vol. 1 Pasadena, California, Jet Propulsion Laboratory. 1969. Doc. 701-23. p. 295-299.

147. RITTENHOUSE, J.B. and W.G. Jurevic. Effects of sterilization procedures on spacecraft materials. IN: Rittenhouse, J.B. and J.B. Singletary, eds. Space Materials Handbook. Washington, D.C. NASA. 1969. Third edition, NASA SP-3051. p. 673-682. (N70-21226#).

148. ROPER, W.D. Sterilizable polymers. IN: Semiannual Review of Research and Advanced Development. Vol. 1 Pasadena, California, Jet Propulsion Laboratory. 1969. Doc. 701-23. p. 81-83.

149. SHERRY, E.J. Stochastic math model. IN: Semiannual Review of Research and Advanced Development. Vol. 1 Pasadena, California, Jet Propulsion Laboratory. 1969. Doc. 701-23. p. 313-314.

150. SHERRY, E.J. and R.H. Green. Planetary quarantine analysis. IN: Semiannual Review of Research and Advanced Development. Vol. 1. Pasadena, California, Jet Propulsion Laboratory. 1969. Doc. 701-23. p. 303-304.

151. Van BELLE, G. Contingency table analysis by means of a linearizing transformation of position variates. Tallahassee, Florida State University. 1969. Technical report #18. 12 p.

1970

152. BROCK, T.D. and G.K. Darland. Limits of microbial existence: temperature and pH. Science 169(3952): 1316-1318. 1970.

153. MILLER, W.S. Dry heat sterilization under high vacuum. IN: I.H. Silver, ed. Proceedings of the 3rd International Symposium on Aerobiology, New York, Academic Press. 1970. p. 96.

154. PARKER, B.C. Life in the sky. Natural History 79(8): 54-59. 1970.

155. UNITED STATES AIR FORCE. Standards and guidelines for the design and operation of clean rooms and clean work stations. 1963. Technical order 00-25-203. 53 p. with Change 1. Washington, D.C. 1970. 17 p.

1971

156. BRUCH, C.W. and M.K. Bruch. Sterilization. IN: Martin, E.W., ed. , Dispensing of Medication. Easton, Pennsylvania, Mack. 1971. p. 592-623.

157. DOYLE, J.E. Sterility indicator with artificial resistance to ethylene oxide. Bulletin of Parenteral Drug Association 25(2): 98-104. 1971.

158. GENERAL ELECTRIC CO., Space Division. Microbial identification system. Final report for Task 5.0 Philadelphia, Pa. 1971. 70SD5414. 93 p. (N73-19132#; NASA-CR-128747).

159. GILLETTE, R.B. and W.D. Beverly. Active cleaning technique for removing contamination from optical surfaces in space. Quarterly progress report for period 1 August - 1 November 1971. Seattle, Washington, The Boeing Company. 1971. QPR 3. 44 p. (N72-12888#; NASA-CR-121040).

160. GONZALEZ, C.C. Planetary quarantine constraints for advanced missions. IN: Planetary quarantine Semiannual Review, Space Research and Technology. Pasadena, California, Jet Propulsion Laboratory. 1971. Doc. 900-556. p. 7-1 to 7-9.

161. HALL, L.B., ed. Planetary quarantine, principles, methods, and problems. New York, Gordon and Breach. 1971. 173 p.

162. HOFFMAN, A.R. Microbial burden prediction model. IN: Planetary Semiannual Review, Space Research and Technology. Pasadena, California, Jet Propulsion Laboratory. 1971. Doc. 900-556. p. 6-1 to 6-5.

163. JET PROPULSION LABORATORY. Planetary quarantine Semiannual Review, Space Research and Technology for period 1 January - 30 June 1971. Pasadena, California. 1971. Doc. 900-556. 138 p. (N73-13086#; NASA-CR-129793).

164. KAZARES, R. Post launch recontamination studies. IN: Planetary quarantine Semiannual Review, Space Research and Technology. Pasadena, California, Jet Propulsion Laboratory. 1971. Doc. 900-556. p. 8-1 to 8-17.

165. MOORE, P. Pollution in space. International Journal of Environmental Studies 1: 195-199. 1971.

166. REUL, R.P., C.E. Hilbers and E. Goller. Forecasting technique for accumulated particulate contamination on spacecraft assemblies. IN: Proceedings of 10th National Conference on Environmental Effects on Aircraft and Propulsion Systems. Philadelphia, Naval Air Propulsion Test Center. 1971. p. 14-1 thru 14-46.

167. SCHNEIDER, H.W. and A.S. Irons. Spacecraft cleaning and decontamination techniques. IN: Planetary quarantine Semiannual Review, Space Research and Technology. Pasadena, California, Jet Propulsion Laboratory. 1971. Doc. 900-556. p. 1-1 to 1-6.

168. SWENSON, B.L. Body shape effects upon survivability during Jovian entry. Moffet Field, California, NASA, Ames Research Center. December 1971. 8 p.

169. TAYLOR, D.M. Planetary quarantine supporting activities. IN: Planetary quarantine Semiannual Review, Space Research and Technology. Pasadena, California, Jet Propulsion Laboratory 1971. Doc. 900-556. p. 4-1 to 4-5.

170. TAYLOR, D.M. and M.D. Knittell. Natural space environmental studies. IN: Planetary quarantine Semiannual Review, Space Research and Technology. Pasadena, California, Jet Propulsion Laboratory. 1971. Doc. 900-556. p. 3-1 to 3-43.

171. TAYLOR, D.M. and R.C. Koukol. Spacecraft monitoring method and procedures. IN: Planetary quarantine Semiannual Review, Space Research and Technology. Pasadena, California, Jet Propulsion Laboratory. 1971. Doc. 900-556. p. 5-1 to 5-19.

172. WARDLE, M.D. Studies on spacecraft sterilization. IN: Planetary quarantine Semiannual Review, Space Research and Technology. Pasadena, California, Jet Propulsion Laboratory. 1971. Doc. 900-556. p. 2-1 to 2-5.

1972

173. ALEXANDER, M. Quarantine for samples from Mars. IN: Schwartz, A.W , ed. Theory and experiment in exobiology. Vol. 2. Groningen, The Netherlands, Wolters-Noordhoff. 1972. p. 121-146. (A73-14321).

174. BOUCHER, R.M.G. and A.J. Last. Ultrasonic synergism in biochemistry, ultrasonic irradiation of nucleic acids and microorganisms, applications to sterilization. Journal of Acoustical Society of America 52(1): 135. 1972.

175. CAMERON, R.E. Microbial and ecological investigations in Victoria Valley, Southern Victoria Land, Antarctica. IN: Llano, G.A., ed. Antarctic Terrestrial Biology. Washington, D.C., American Geophysical Union. 1972. Antarctic Research Series, vol. 20: 195-260.

176. CAMPBELL, J.E. Ecology and thermal inactivation of microbes in and on interplanetary space vehicle components. 29th quarterly report for period 1 April - 30 June 1972. Cincinnati, U.S. Department of Health, Education and Welfare, Food and Drug Administration, Cincinnati Research Laboratories. 1972. 10 p. (N73-12101#; NASA-CR-129272).

177. DE WITT, D.P. and R.S. Hernicz. Theory and measurement of emittance properties for radiation thermometry applications. IN: 5th Symposium on Temperature, Its Measurement and Control in Science and Industry. Proceedings, Part I. Pittsburgh, Pa., Instrument Society of America. 1972. p. 459-482. (A73-41982).

178. DWIVEDI, N.P. Aiming strategies for quarantined multi-planet missions. Jet Propulsion Laboratory Quarterly Technical Review. Pasadena, California, Jet Propulsion Laboratory. 1972. 2(2): 9-17.

179. EXOTECH SYSTEMS, INC. Planning, evaluation, and analytical studies to implement planetary quarantine requirements. Seventh quarterly progress report for period of 1 September through 31 December 1971. Washington, D.C. 1972. 5 p.

180. FAVERO, M.S. Services provided in support of the planetary quarantine requirements of NASA. Report No. 39 for period July - September 1972. Phoenix, Arizona, Public Health Service, Center for Disease Control, U.S. Department of Health, Education and Welfare. 1972. 28 p. (N73-12100#; NASA CR-129513).

181. FAVERO, M.S. Status of teflon strip experiments at KSC. Presentation at AIBS-PQ Panel, Atlanta, Georgia. October 1972.

182. FISHER, D.A., R.L. Jacobson and I.J. Pflug. Relationships of different indices of water content in dry heat microbial destruction systems. IN: Pflug, I.J., ed. Environmental Microbiology as Related to Planetary Quarantine, semiannual progress report #8. Minneapolis, University of Minnesota. 1972. p. 45-62.

183. FISHER, D.A. and I.J. Pflug. Effect of combined heat and radiation on microbial destruction. IN: Pflug, I.J., ed. Environmental Microbiology as Related to Planetary Quarantine, semiannual progress report #8. Minneapolis, University of Minnesota. 1972. p. 41-44.

184. GOODY, R.M., N. Horowitz, A. Rich, et al. Quarantine considerations for outer planets missions. Cambridge, Mass., Harvard University. 1972. 10 p. with supporting correspondence.

185. JAHN, W. and M. Schinkmann. Radiation sterilization with a Van de Graaff accelerator. Atomwirtschaft. 17: 527-529. September/October 1972. NASA TT-F- 14,821. (N73-20120#).

186. KALFAYAN, S.H. Spacecraft sterilization. IN: Landel, R.F. and A. Rembaum, eds. Chemistry in Space Research. New York, Elsevier. 1972. p. 599-653. (A73-30137).

187. MORELLI, F.A., R.E. Cameron, D.R. Gensel et al. Monitoring of Antarctic dry valley drilling sites. Antarctic Journal of the United States VII(4): 92-94. 1972.

188. NIEPOKOJCZYCKA, E. and K. Zakrzewski. Alumina-attached spores of Bacillus stearothermophilus for the control of sterilization process. Acta Microbiologica Polonica, series B: Microbiologia applicata 4(21) no. 3:141-153. 1972.

189. PFLUG, I.J., ed. Environmental microbiology as related to planetary quarantine. Semiannual progress report No. 8. Minneapolis, University of Minnesota. 1972. 90 p. (N74-10092#; NASA-CR-135980).

190. PFLUG, I.J. Status of low temperature research: University of Minnesota. Presented at AIBS-PQ Panel, Atlanta, Georgia. October 1972.

191. PFLUG, I.J., J.E. Bearman and R.L. Jacobson. Biological indicators for monitoring sterilization processes. IN: Pflug, I.J., ed. Environmental Microbiology as Related to Planetary Quarantine, semiannual progress report #8. Minneapolis, University of Minnesota. 1972. p. 63-86.

192. PODOPRIGORA, G.I. and M.M. Intizarov. Use of ultra-fine fiber filter cloth for removing bacterial contaminants from the air. Zhurnal Microbiologii, Epidemiologii i Immunobiologii. p. 130-131. 1972. Washington, D.C., NASA TT F-14,940.

193. REYNOLDS, M.C. and J.P. Brannen. Thermal enhancement of radiosterilization. Albuquerque, New Mexico, Sandia Laboratories. 1972. Presented in India as paper IAEA/SM-166/48. 18 p.

194. SMITH, G.M. and I.J. Pflug. Dry heat destruction rates of microorganisms on surfaces. IN: Pflug, I.J., ed. Environmental Microbiology as Related to Planetary Quarantine, semiannual progress report #8. Minneapolis, University of Minnesota. 1972. p. 25-38.

204. BRADLEY, F.D. and M.R. Nadel. Bibliography of scientific publications and presentations relating to planetary quarantine, 1966-1971. Washington, D.C., The George Washington University. 1973. GWU-BSCP 73-10P. 220 p. (N73-22038#; NASA-CR-131889).

205. BRADLEY, F.D. and M.R. Nadel. Scientific publications and presentations relating to planetary quarantine. Vol. V, The 1972 Supplement. Washington, D.C., George Washington University, Biological Sciences Communication Project. 1973. GWU-BSCP 73-14P. (N73-25112#; NASA-CR-131817).

206. BREWER, J.A. and A.G. Turner. Replicating Rodac plates for identifying and enumerating bacterial contamination. Health Laboratory Science 10(3): 195-202. 1973.

207. BROWN, O.R. and D. Peterson. Sensitivity to oxygen at high pressure of radioresistant and radiosensitive strains of bacteria. Aerospace Medicine 44(1): 71-73. 1973.

208. CADY, P. Rapid automated bacterial identification by impedance measurement. Palo Alto, California, Bactomatic, Inc. 1973. 38 p.

209. CAMPBELL, J.E. Ecology and thermal inactivation of microbes in and on interplanetary space vehicle components. 30th quarterly report of progress for period 1 July - 30 September 1972. Cincinnati, U.S. Department of Health, Education and Welfare, Food and Drug Administration. 1973. 7 p. (N73-19122#; NASA CR-131103).

210. *idem,* 31st quarterly report of progress for period 1 October - 31 December 1972. Cincinnati, U.S. Department of Health, Education and Welfare, Food & Drug Administration. March 1973. 6 p. (N73-26058#; NASA CR-133224).

211. *idem,* 32nd quarterly report of progress for period 1 January - 31 March 1973. Cincinnati, U.S. Department of Health, Education and Welfare, Food & Drug Administration. June 1973. 9 p. (N73-26059#; NASA CR-133224).

212. CHEN, M. and M. Alexander. Survival of soil bacteria during prolonged dessication. Soil Biology and Biochemistry 5: 213-221. 1973. (A73-30959).

195. SMITH, G.M. and I.J. Pflug. Survival of microbial spores under several temperature and humidity conditions. IN: Pflug, I.J., ed. Environmental Microbiology as Related to Planetary Quarantine, semiannual progress report #8. Minneapolis, University of Minnesota. 1972. p. 1-23.

196. STEIGER, E. Study of the resistance of cultured and natural microbes using the ethylene oxide sterilization method. Zeitschrift fuer die gesamte Hygiene und ihre Grenzgebiete 17(10): 744-749. 1971. Washington, D.C., NASA TT F-14,612. 1972. 16 p. (N73-13078#).

197. TULIS, J.J., D.J. Daley and G.B. Phillips. Investigation of methods for sterilization of potting compounds and mated surfaces. Final report for period August 1969 - December 1971. Prepared by Becton, Dickinson and Company for George C. Marshall Space Flight Center. 142 p. (N72-33080#; NASA-CR-128368).

198. VLODAVETS, V.V. Current problems in aerobiology (a survey of the literature). Translation of Zhurnal Mikrobiologii, Epidemiologii i Immunobiologii. (USSR) 6: 56-59. 1972. Arlington, Virginia, Joint Publications Research Service 57016. 9 p.

1973

199. BAÉ, H.C. and L.E. Casida, Jr. Responses of indigenous microorganisms to soil incubation as viewed by transmission electron microscopy of cell thin sections. Journal of Bacteriology 113(3): 1462-1473. 1973. (A73-29724).

200. BECTON, DICKSON & COMPANY. Industrial Sterilization, Phillips, G.B. and W.S. Miller, eds. Durham, North Carolina, Duke University Press, 1973. 426 p. (A73-33691).

201. BEYERLE, F.J. Biodetection grinder. Huntsville, Alabama, Marshall Space Flight Center. 1973. NASA TM X-64765. 27 p.

202. BOND, W.W., M.S. Favero and M.R. Korber. Bacillus sp. ATCC 27380: Spore with extreme resistance to dry heat. Applied Microbiology 26(4): 614-616. 1973.

203. BORICK, P.M., ed. Chemical Sterilization. Stroudsburg, Pennsylvania, Dowden, Hutchinson and Ross, Inc. 1973. 352 p.

213. DILLON, R.T., W.R. Gavin, A.L. Roark et al. Estimating the number of terrestrial organisms on the moon. Space Life Sciences 4(1): 180-199, 1973. (A73-26488).

214. DIMMICK, R.L. and M.A. Chatigny. Studies on possible propagation of microbial contamination in planetary clouds. Annual report. Oakland, California, Naval Biomedical Research Laboratory. January 1973. 19 p. (N73-19127#).

215. DIMMICK, R.L., M.A. Chatigny and H. Wolochow. Studies on possible propagation of microbial contamination in planetary clouds. IN: Naval Biomedical Research Laboratory, Technical Progress Report, Vol. 48:347-358. Berkeley, California, Office of Naval Research. 1973. UC-NBRL Doc. 73-1. (N73-29049#; NASA CR-133638).

216. DUKE, M.B. and M.A. Reynold. Lunar sample quarantine procedures: Interaction with non-quarantine experiments. Houston, Texas, NASA, Johnson Space Center. Presented at COSPAR, Konstanz, West Germany, 1973. Paper L.7.5. 16 p. (A73-35978#).

217. EFRON, B. Analysis of microbial burden date. IN: Planetary Quarantine Annual Review, Space Technology and Research. Pasadena, California, Jet Propulsion Laboratory. 1973. Doc. 900-597. p. A-1 to A-10.

218. ERNST, R.R. Ethylene oxide gaseous sterilization for industrial applications. IN: Phillips, G.B. and W.S. Miller, eds. Industrial Sterilization. Durham, North Carolina, Duke University Press. 1973. p. 181-208.

219. EXOTECH SYSTEMS, INC. Effect of WSMR impact data on release parameter evaluation. Falls Church, Virginia. March 1973. TR 73-1-01. 11 p. (N73-25904#; NASA CR-131835).

220. EXOTECH SYSTEMS, INC. Scientific and technical services for development of planetary quarantine measures for automated spacecraft. 3rd quarterly progress report for period 1 October - 31 December 1972. Washington, D.C.. 1973. 8 p. (N73-71865; NASA CR-131055).

221. *idem*, Final report. Falls Church, Virginia. 1973. NASw-2372. TR-73-F. 40 p. (N73-20126#; NASA CR-131291).

222. *idem*, First quarterly report for period ending June 30. Falls Church, Virginia. 1973. NASw-2503. 40 p. (N73-26066#; NASA CR-133202).

223. *idem*, Second quarterly report. Falls Church, Virginia. October 1973. 24 p. (N73-33040#; NASA CR-135795).

224. FARMER, F.H., H.V. Fuller and R.M. Hueschen. Investigation of a sterile access technique for the repair and adjustment of sterile spacecraft. Hampton, Virginia, NASA, Langley Research Center. 1973. NASA TN D-7147. 55 p. (N73-17122#).

225. FAVERO, M.S. Monitoring for microbial flora. IN: Phillips, G.B. and W.S. Miller, eds. Industrial Sterilization. Durham, North Carolina, Duke University Press. 1973. p. 343-355. (A73-33698).

226. FAVERO, M.S. Services provided in support of the planetary quarantine requirements of NASA. Report No. 40 for period October - December 1972. Phoenix, Arizona, Center for Control, Public Health Services, U.S. Department of Health, Education, and Welfare. 1973. 23 p. (N73-19123#; NASA CR-131086).

227. *idem*, Report No. 41 for period January - March 1973. Phoenix, Arizona, Center for Disease Control, Public Health Service, U.S. Department of Health, Education and Welfare. 1973. 11 p. (N73-23056#; NASA CR-132022).

228. *idem*, Report No. 42 for period April - June 1973. Phoenix, Arizona, Center for Disease Control, Public Health Services, U.S. Department of Health, Education and Welfare. 1973. 9 p. (N-73-30064#; NASA CR-133742).

229. FLETCHER, J.C. and B.A. Zohlava. Vacuum probe surface sampler. Rutherford, N.J., Becton, Dickinson & Company. 1973. U.S. Patent 3,748,905.

230. FOSTER, T.L. Study of psychrophilic organisms isolated from the manufacture and assembly areas of spacecraft to be used in the Viking mission. Report for period of 1 October - 31 December 1972. Abilene, Texas, Hardin-Simmons University. 1973. 28 p. (N73-16059#; NASA CR-130009).

231. *idem*, Report for period 1 January - 30 June 1973. Abilene, Texas, Hardin-Simmons University. 1973. 44 p. (N73-26063#).

232. GONZALEZ, C.C. Planetary quarantine constraints (strategies) for advanced missions. IN: Planetary Quarantine Annual Review, Space Technology and Research. Pasadena, California, Jet Propulsion Laboratory. 1973. Doc. 900-597. p. 1-1 to 1-23.

233. GONZALEZ, C.C., W. Jaworski, A.D. McRonald, et al. Spacecraft microbial burden reduction due to atmospheric entry heating - Jupiter. Pasadena, California, Jet Propulsion Laboratory. 1973. COSPAR paper L.7.8. 15 p. (N73-24117#; NASA CR-132072; A73-36100#).

234. GONZALEZ, C.C. and W. Stavro. Significance of outer planet satellite quarantine constraints on aim-point selection. Presentation at annual meeting of American Institute of Astronautics and Aeronautics, Denver, Colorado, July 1973. Pasadena, California, Jet Propulsion Laboratory. 1973. 3 p. (A73-36096#).

235. HALL, L.B. Sterilization technology in the United Stated space program. IN: Phillips, G.B. and W.S. Miller, eds. Industrial Sterilization. Durham, North Carolina, Duke University Press. 1973. p. 337-342. (A73-33697).

236. HALL, L.B. Ten years of development of the planetary quarantine program of the United States. Life Sciences and Space Research Vol. XII: 185-197. Berlin, Akademie-Verlag. 1974. (A73-35966#).

237. HARRISON, J.M. and D.W. North. Probabilistic models of planetary contamination. Menlo Park, California, Stanford Research Institute. April 1973. MSU-2274. 51 p. (N73-23829#; NASA CR-132001).

238. HARRISON, J.M. and D.W. North. Probabilistic structure of planetary contamination models. Menlo Park, California, Stanford Research Institute. 1973. SRI Project 2274, memo #1. 33 p. (N73-17013#; NASA CR-130558).

239. HOFFMAN, A.R. Spacecraft microbial burden estimation and prediction. IN: Planetary Quarantine Annual Review, Space Technology and Research. Pasadena, California, Jet Propulsion Laboratory. 1973. Doc. 900-597. p. 5-1 to 5-19.

240. HOFFMAN, A.R., W. Stavro and C. Gonzalez. Quarantine constraints as applied to satellites. Pasadena, California, Jet Propulsion Laboratory. 1973. COSPAR paper L.7.9. 15 p.

241. HOFFMAN, A.R., W. Stavro, L.W. Miller, et al. Terrestrial quarantine considerations for unmanned sample return missions. Pasadena, California, Jet Propulsion Laboratory. 1973. COSPAR paper L.7.7. 15 p. (N73-24118#; NASA CR-132071; A73-35977#).

242. IMSHENETSKY, A.A., L.A. Kouzyurina and V.M. Jakshina. Multiplication of xerophilic microorganisms under simulated Martian conditions. IN: P.H.A. Sneath, ed. Life Sciences and Space Research XI: 63-66. Berlin, Akademie-Verlag. 1973. (A73-42165#).

243. JET PROPULSION LABORATORY. Planetary Quarantine. Annual Review of Research and Advanced Development for the period 1 July - 30 June 1973. Pasadena, California. 1973. Doc. 701-185. p. 91-101.

244. JET PROPULSION LABORATORY. Mariner Mars 1971 project. Final report. Pasadena, California. 1973. Technical Report 32-1550, Vol. 1. p. 34-35, 68.

245. JET PROPULSION LABORATORY. Planetary Quarantine. Annual Review, Space Technology and Research. For period July 1971 - July 1972. Pasadena, California. 1973. Doc. 900-597. 197 p. (N73-18123#; NASA CR-130861).

246. *idem*, Semiannual Review, Space Research and Technology for period 1 January - 30 June 1973. Pasadena, California. 1973. Doc. 900-636. 72 p. (N73-33041#; NASA CR-135791).

247. KAZARES, R. and J. Barengoltz. Post launch recontamination studies. IN: Planetary Quarantine Annual Review, Space Technology and Research. Pasadena, California, Jet Propulsion Laboratory. 1973. Doc. 900-597. p. 4-1 to 4-32.

248. KOUKOL, R.C. Microbiological sampling of spacecraft cabling, antennas, solar panels and thermal blankets. Pasadena, California, Jet Propulsion Laboratory. Doc. 900-602. 1973. 18 p. (N73-17109#; NASA CR-130383).

249. LOZINA-LOZINSKIY, L.K. Cryobiological studies and space biology problems. IN: Ocherki po Kriobiologii. Izd-vo Nauka Leningrad. 1972. p. 238-260. Arlington, Virginia, Joint Publications Research Service 59129. 1973. (N73-24120#).

250. LOZINA-LOZINSKIY, L.K. Resistance of unicellular organisms to ultraviolet radiation in relation to the problem of the existence of extraterrestrial life. IN: V.N. Chernigovskiy, ed. Problems of Space Biology Vol. 16: 378-392. Moscow 1971. Washington, D.C., NASA TT F-719. 1973. (N73-19118).

251. LUKIN, A.A. and G.P. Parfenov. Microbiological investigations during spaceflight. Kosmicheskaya Biologiya i Meditsina, 7(2): 3-13. 1973. Space Biology and Medicine, No. 2: 1-15. 1973. Arlington, Virginia, Joint Publications Research Service 59015.

252. MILLER, L.W. Planetary quarantine constraints for unmanned planetary sample return missions. IN: Planetary Quarantine Annual Review, Space Technology and Research. Pasadena, California, Jet Propulsion Laboratory. 1973. Doc. 900-597. p. 2-1 to 2-17.

253. MOLTON, P., J. Williams and C. Ponnamperuma. Survival of common bacteria in liquid culture under carbon dioxide at high temperatures. Nature 243(5404): 242-243. 1973. (A73-32650).

254. PAPPAS, S.P., P. Hsiao and L.W. Hill. Quantitation of buried contamination by use of solvents. Semiannual report for period 1 July - 31 December 1972. Fargo, North Dakota, North Dakota State University. 1973. 12 p. (N73-17111#; NASA CR-130720).

255. *idem,* Semiannual report for period 1 January - 30 June 1973. Fargo, North Dakota, North Dakota State University. 1973. 9 p. (N73-30535#; NASA CR-133645).

256. PARFENOV, G.P. and A.A. Lukin. Results and prospects of microbiological studies in outer space. Space Life Sciences 4(1): 160-179. 1973. (A73-26487).

257. PFLUG, I.J. Heat sterilization. IN: Phillips, G.B. and W.S. Miller, eds. Industrial Sterilization. Durham, North Carolina, Duke University Press. 1973. p. 239-282. (A73-33695).

258. REYNOLDS, O.E. Developments in the analysis of planetary quarantine requirements. IN: Sneath, P.H.A., ed. Life Sciences and Space Research, Vol. XI. Berlin, Akademie-Verlag. 1973. p. 3-39. (A73-42159#).

259. REYNOLDS, O.E. Planetary quarantine constraints established by COSPAR and NASA. Presentation to Life Science Committee Subcommittee for Review of Planetary Quarantine. Washington, D.C. January 1973. 9 p.

260. REYNOLDS, M.C., K.F. Lindell and T.J. David. Thermoradiation inactivation of naturally occurring organisms in soil. Albuquerque, New Mexico, Sandia Laboratories. 1973. 12 p. (N73-25404#; NASA CR-132197; SLA-73-161/GA).

261. RUMYANTSEVA, V.M., V.L. Levin and M.A. Rybin. Problems of the survival of microorganisms under conditions simulating those on Mars. IN: V.N. Chernigovskiy, ed. Problems in Space Biology Biology. Vol. 16: 366-370. Moscow 1971. Washington, D.C. NASA TT F-719. 1973. (N73-19116; A71-42826#).

262. SCHINKMANN, M. Basic principles of radiation sterilization of disposable medical articles. Kerntechnik 5: 201-207. 1973.

263. SCHNEIDER, H.W. Mechanical removal of spacecraft microbial burden. IN: Planetary Quarantine Annual Review, Space Technology and Research. Pasadena, California, Jet Propulsion Laboratory. 1973. Doc. 900-597. p. 6.1-1 to 6.1-37.

264. SCHWAGER, M. Method allowing biological and biochemical studies of vacuum-exposed bacteria. Space Life Sciences 4(2): 271-277. 1973. (A73-39483).

265. SIVINSKI, H.D., D.M. Garst, M.C. Reynolds, et al. Synergistic inactivation of biological systems by thermoradiation. IN: Phillips, G.B. and W.S. Miller, eds. Industrial Sterilization. Durham, North Carolina, Duke University Press. 1973. p. 305-342. (A73-33696).

266. SOCIETY FOR INDUSTRIAL MICROBIOLOGY. Developments in Industrial Microbiology, Murray, E.D., ed. Vol. 14. Washington, D.C., American Institute of Biological Sciences. 1973.

267. SWEDISH NATURAL SCIENCE RESEARCH COUNCIL. Ecology Research Committee, T. Rosswall, ed. Modern methods in the study of microbial ecology. Bulletin No. 17, Stockholm, Sweden. 1973. 511 p.

268. TAYLOR, D.M. Plasma cleaning and decontamination techniques. IN: Planetary Quarantine Annual Review, Space Technology and Research. Pasadena, California, Jet Propulsion Laboratory. 1973. Doc. 900-597. p. 6.1-1 - 6.1 -37.

269. TAYLOR, D.M. and C.A. Hagen. Natural space environment studies. IN: Planetary Quarantine Annual Review, Space Technology and Research. Pasadena, California, Jet Propulsion Laboratory. 1973. Doc. 900-597. p. 3-1 to 3-36.

270. JET PROPULSION LABORATORY. Planetary Quarantine Semiannual Review, Space Research and Technology. For period 1 July - 31 December 1972. Pasadena, California. 1973. Doc. 900-608. 94 p. (N73-22039#; NASA CR-131845).

271. TRUJILLO, R. and K.F. Lindell. New formaldehyde base disinfectants. Applied Microbiology 26(1): 106-110. 1973. (A73-43276).

272. TULIS, J.J. Formaldehyde gas as a sterilant. IN: Phillips, G.B. and W.S. Miller, eds. Industrial Sterilization. Durham, North Carolina, Duke University Press. 1973. p. 209-238. (A73-33694).

273. UNITED STATES GOVERNMENT. Clean room and work station requirements, controlled environment. Federal Standard 209B. Revised edition. Washington, D.C., General Services Administration. 1973. 35 p.

274. U.S.P.H.S., Kennedy Space Center. Protocol for a standardized calibrated system for the evaluation of physical variables in dry heat sterilization studies. Presentation to the AIBS Planetary Quarantine Panel, April 1973. 9 p.

275. VASHKOV, V.I., V.M. Tsetlin, L.B. Chudnova, et al. Polyurethane foam sterilization by the gas method. IN: Sneath, P.H.A., ed. Life Sciences and Space Research XI: 9-11. Berlin, Adademie-Verlag. 1973. (A73-42160#).

276. VASHKOV, V.I., N.V. Ramkova, G.V. Scheglova et al. Verification of the efficacy of spacecraft sterilization. Presented at COSPAR, Konstanz, West Germany. 1973. Paper L.7.2. 11 p.

277. WARDLE, M.D. Thermal resistance of microbial populations occurring in spacecraft assay areas. IN: Planetary Quarantine Annual Review, Space Technology and Research. Pasadena, California, Jet Propulsion Laboratory. 1973. Doc. 900-597. p. 6.2-1 to 6.2-4.

278. WARDLE, M.D. Verfication of USSR hydrogen peroxide decontamination. IN: Planetary Quarantine Annual Review, Space Technology and Research. Pasadena, California, Jet Propulsion Laboratory. 1973. Doc. 900-597. p. 6.3-1 to 6.3-2.

279. WARDLE, M.D., A.S. Irons and R.H. Green. Planetary quarantine goes to work in the hospital. Astronautics & Aeronautics 11(6): 32-38. 1973.

280. WHITE, J.D. and T.J. Bradley. Residual ethylene oxide in gas-sterilized medical-grade silicones. Journal of Pharmaceutical Sciences 62(10): 1634-1637. 1973.

281. WHITFIELD, O., E.L. Merek and V.I. Oyama. Effect of simulated lunar impact on the survival of bacterial spores. Space Life Sciences 4(2): 291-294. 1973. (A73-39485).

282. WOLOCHOW, H., M. Chatigny and J. Hebert. Release of bacterial spores from the inner walls of a stainless steel cup subjected to thermal stresses and mechanical shock. IN: ONR, Naval Biomedical Research Laboratory, 48th Technical Progress Report. 1973. p. 363-386. (N73-30987#; NASA CR-133868).

AUTHOR INDEX

PERMUTED TITLE INDEX

BOOKS CONTAINING

PLANETARY QUARANTINE RELATED MATERIAL

Each of the following books, cited in this bibliography, contains information pertinent to the substantive program of the NASA Planetary Quarantine mission.


Aerobiology, proceedings of the 3rd international symposium, Sussex, England. 1969. Silver I.H. ed. New York, N.Y., Academic. 1970.

Air Force Manual, Criteria for Air Force clean facility design and construction. Washington, D.C., Department of the Air Force. 1968. AFM 88-4, Chapter 5.

Antarctic Terrestrial Biology, Antarctic Research Series. Washington, D.C., American Geophysical Union. 1972. Vol. 20.

Biology and the exploration of Mars. Pittendrigh, C.S., W. Vishniac and J.P.T. Pearman, eds. Washington, D.C., Space Science Board, National Academy of Sciences/National Research Council. 1966. Publication 1296.

Chemistry in Space Research. Landel, R.F. and A. Rembaum, eds. New York, N.Y., Elsevier. 1972.

Chemical Sterilization. Borrick, P.M. ed. Stroudsburg, Pa., Dowden, Hutchinson and Ross. 1973.

Developments in Industrial Microbiology. Vol. I. Miller, B.M. ed., New York, N.Y., Plenum Press. 1960.

*idem*, Vol. 14. Murray, E.D. ed. Washington, D.C., American Institute of Biological Sciences. 1973.

Dispensing of Medication. Martin, E.W. ed. Easton, Pa., Mack. 1971

Essays in Cryobiology. (Ocherki po Kriobiologii) Leningrad. Iza-vo Nauka. 1972.

Industrial Sterilization. Phillips, G.B. and W.S. Miller, eds. Durham, North Carolina, Duke University Press. 1973.

Life Sciences and Space Research Vol. XI, Sneath, P.H.A., ed. Berlin, Akademie-Verlag. 1973.

Modern Methods in the Study of Microbial Ecology. Rosswall, T., ed. Stockholm, Rotobeckman. 1973.

Planetary Quarantine, Principles, Methods, and Problems. Hall, L.B. ed. New York, N.Y., Gordon and Breach. 1971.

Problems in Space Biology, Vol. 16, Chernigovskiy, V.N., ed. Moscow. 1973

Space Materials Handbook. Rittenhouse, J.B. and J.B. Singletary, eds. Washington, D.C., NASA. 1969. 3rd ed. NASA SP-3051.

Theory and Experiment in Exobiology. Vol. 2. Schwartz, A.W. ed. Groningen, The Netherlands, Wolters-Noordhoff. 1972.

Thermobacteriology in Food Processing. New York, N.Y., Academic. 1965.

## JOURNALS PUBLISHING

## PLANETARY QUARANTINE RELATED ARTICLES

Below is an alphabetical list of journals in which articles germane to planetary quarantine have been published. The number of articles from each journal cited in this bibliography is indicated parenthetically.

| | |
|---|---|
| Acta Microbiologica Polonica, series B (Poland) | (1) |
| Aerospace Medicine | (1) |
| American Journal of Hygiene | (4) |
| American Journal of Public Health | (1) |
| American Society of Heating, Refrigeration and Air-conditioning Engineers Journal | (1) |
| Antarctic Journal of the United States | (3) |
| Applied Microbiology | (11) |
| Association for Operating Room Nurses Journal | (1) |
| Astronautics and Aeronautics | (2) |
| Atomwirtschaft (West Germany) | (1) |
| Australian Journal of Biological Sciences | (1) |
| Bioscience | (1) |
| Bulletin of the Parenteral Drug Association | (2) |
| Canadian Journal of Microbiology | (1) |
| Food Technology | (1) |
| Health Laboratory Science | (2) |
| International Committee of Scientific Unions Review | (1) |
| International Journal of Experimental Studies | (1) |
| Journal of Bacteriology | (5) |
| Journal of General Microbiology (United Kingdom) | (2) |
| Journal of Microbiology, Epidemiology and Immunobiology (USSR) Zhurnal Microbiologii, Epidemiologii i Immunobiologii | (2) |
| Journal of Pharmaceutical Sciences | (1) |
| Journal of the Acoustical Society of America | (1) |
| Journal of the American Association for Contamination Control | (2) |
| Journal of the American Medical Association | (1) |
| Journal of the Astronautical Sciences | (1) |
| Kerntechnik (West Germany) | (1) |
| Natural History | (1) |
| Nature (United Kingdom) | (4) |
| Official Digest, Federation of Paint and Varnish Production Clubs | (1) |
| Proceedings of the Royal Society (United Kingdom) | (2) |
| Quality Assurance | (1) |
| Science | (2) |

| | |
|---|---|
| Soap and Chemical Specialities | (2) |
| Soil Biology and Biochemistry (United Kingdom) | (1) |
| Space Biology and Medicine (USSR) Kosmicheskays Biologiya i Meditsina | (1) |
| Stiinta Si Technica (Rumania) | (1) |
| Space Life Sciences (The Netherlands) | (4) |
| Zeitschrift fuer die gesamte Hygiene und ihre Grenzgebiete (East Germany) | (1) |

## PROCEEDINGS PUBLISHING

## PLANETARY QUARANTINE RELATED PAPERS

Below is an alphabetical list of proceedings in which papers germane to planetary quarantine have appeared. The number of papers from each meeting cited in this bibliography is indicated parenthetically.

American Institute of Astronautics and Aeronautics. Annual meeting. Denver, Colorado. 1973. (1)

AIAA/ASME Structural and Materials Conference. Cocoa Beach, Florida. 1966. (1)

American Astronautical Society. Space projections from the Rocky Mountain Regions. Denver, Colorado. 1968. (2)

American Institute of Biological Sciences, Planetary Quarantine panel meetings. Atlanta, Georgia. 1972; Cape Canaveral, Florida. 1973. (2)

American Society for Microbiologists. Washington, D.C. Bacteriological proceedings. 1962; Bacteriological proceedings. 1964. (3)

Automated methods in bacteriology, international symposium. Stockholm, Sweden. 1973. (1)

Cleaning conference. Marshall Space Flight Center, Huntsville, Alabama. 1966. (1)

COSPAR XVI Plenary meeting. Konstanz, West Germany. 1973. (5)

Environmental effects on aircraft and propulsion systems. Proceedings of 10th national conference. Philadelphia, Pa. 1971 (1)

Instrument Society of America, 5th symposium on temperative, its measurement and control in science and industry, proceedings, Pittsburgh, Pa. 1972. (1)

International Astronautical Federation. 17th International astronautical congress. Madrid, Spain. 1966. (1)

Life Science Committee, NAS/NRC. Subcommittee for review of planetary quarantine. Washington, D.C. 1973. (1)

Soviet conference on space biology and medicine. USSR. 1966. (1)

National planning conference on design for asepsis. New York, N.Y. 1964. (1)

## CORPORATE SOURCES

Below is an alphabetical address list of NASA centers, NASA contractors, and other sources of the material cited in this bibliography.

Air Force, Department of the
Washington, D.C. 20333

American Institute of Biological Sciences
1401 Wilson Boulevard
Arlington, Virginia 22209

American Society for Microbiologists
1913 I Street, N.W.
Washington, D.C. 20006

Ames Research Center
National Aeronautics and Space Administration
Moffett Field, California 94035

Army, Department of the
Fort Detrick
Frederick, Maryland 21701

Avco Corporation
Space Systems Division
Lowell Industrial Park
Lowell, Massachusetts 01851

Bactomatic, Inc.
Palo Alto, California 94300

Becton, Dickinson & Co.
Research Center
P.O. Box 12016
Research Triangle Park
North Carolina 27709

Boeing Company, The
Aerospace Group
P.O. Box #3999
Seattle, Washington 98124

Center for Disease Control
Phoenix Laboratories
4402 North Seventh Street
Public Health Service
U.S. Department of Health, Education and Welfare
Phoenix, Arizona 85014

Dynamic Science Corporation
1900 Walker Avenue
Monrovia, California 91016

Exotech Systems, Inc.
1200 Quince Orchard Boulevard
Gaithersburg, Maryland 20760

Florida State University
Department of Statistics
Tallahassee, Florida 32306

Food and Drug Administration
Cincinnati Research Laboratories
U.S. Department of Health, Education and Welfare
1090 Tusculum Avenue
Cincinnati, Ohio 45226

General Electric Company
Re-entry and Environmental Systems Division
3198 Chestnut Street
Philadelphia, Pennsylvania 19101

General Services Administration
U.S. Government
Washington, D.C. 20407

George Washington University, The
Science Communication Division
2001 S Street, N.W.
Washington, D.C. 20009

Goddard Space Flight Center
National Aeronautics and Space Administration
Greenbelt, Maryland 20771

Hardin-Simmons University
Department of Biology
Abilene, Texas 79601

Harvard University
Cambridge, Massachusetts 02138

Hughes Aircraft Company
Aerospace Group
Centinela Avenue and Teale Street
Culver City, California 90230

Illinois Institute of Technology
Research Institute
3300 South Federal Street
Chicago, Illinois 60616

Instrument Society of America
Pittsburgh, Pennsylvania 15200

Jet Propulsion Laboratory
California Institute of Technology
4800 Oak Grove Drive
Pasadena, California 91103

Lyndon B. Johnson Space Center
National Aeronautics and Space Administration
Houston, Texas 77058

Joint Publications Research Service
1000 North Glebe Road
Arlington, Virginia 22201

Langley Research Center
National Aeronautics and Space Administration
Langley Station
Hampton, Virginia 23365

Lobund Laboratory
University of Notre Dame
Notre Dame, Indiana 46556

Lockheed Missiles and Space Company
P.O. Box #504
Sunnyvale, California 94088

George C. Marshall Space Flight Center
National Aeronautics and Space Administration
Marshall Space Flight Center
Alabama 35812

Martin Marietta Corporation
Denver, Colorado 80200

Naval ONR/Biomedical Research Laboratory
Naval Supply Center
University of California, Berkeley
Oakland, California 94625

National Academy of Sciences
National Research Council
2101 Constitution Avenue, N.W.
Washington, D.C. 20037

National Aeronautics and Space Administration
Headquarters
Washington, D.C. 20546

North Dakota State University
Fargo, North Dakota 58102

Sandia Corporation
Sandia Base
P.O. Box #5800
Albuquerque, New Mexico 87115

Stanford Research Institute
Menlo Park, California 94025

State University of New York
Research Foundation
1400 Washington Avenue
Albany, New York 12203

University of Minnesota
Space Science Center
School of Public Health
Minneapolis, Minnesota 55455

Vitro Engineering Company
New York, New York 10000

Wilmot Castle Company
Rochester, New York 14601

Wright Patterson
Air Force Base
Dayton, Ohio 45433